

**SUBMISSION**  
**TO**  
**HOUSE OF REPRESENTATIVES STANDING COMMITTEE**  
**ON**  
**INDUSTRY AND RESOURCES**  
**INQUIRY INTO**  
**DEVELOPING AUSTRALIA'S NON-FOSSIL**  
**FUEL ENERGY INDUSTRY**

**MAY 2005**



## RECOMMENDATIONS

1. That Australia adopt an active exploration program to identify further uranium mineralisation, as very little exploration for uranium has been conducted since 1983.
2. That there should be no undue restraint on, or discrimination against, the development of uranium deposits. Uranium should be treated in a similar way to other minerals, with proper and consistent attention to occupational health and environmental issues.
3. That while export controls are important to Australia's participation in international non-proliferation arrangements and to ensure that Australian uranium is used for exclusively peaceful purposes, there should be no other restraints on the export of uranium.
4. That consideration and encouragement be given to developing and introducing various value adding activities in Australia, particularly uranium enrichment, thus capitalising on new technologies.
5. That the question of nuclear energy being used as an electricity supply option in Australia be constantly reviewed. The future adoption of nuclear energy will allow Australia to effectively contribute to the consistent global reduction of greenhouse gas emissions on a 'no regrets' basis.

## BACKGROUND

Uranium has been mined in Australia since 1954. Initial production during 1954-71 was largely intended for weapons programs, but a proportion was used by the emerging nuclear electricity industry. Since 1976, all uranium mined in Australia has been used exclusively for peaceful purposes, in nuclear electricity generation and to a very minor extent, in the production of medical and industrial isotopes.

While production from one of Australia's first uranium mines, Mary Kathleen, recommenced in 1976, the current phase of Australian uranium mining really started when, following the protracted Ranger Inquiry, the Commonwealth Government announced in 1977 that new mines would be allowed to proceed, subject to a range of conditions. Nabarlek and Ranger then started up.

The Labor Party's election to government in 1983 however, signalled a reversal of this policy. In 1984, Labor introduced what became widely known as "the three mines policy", nominating Ranger, Nabarlek and Olympic Dam as the only projects from which exports of uranium would be permitted. Provisional approvals for marketing from other prospective uranium mines were cancelled. This policy remained in force until the election of a Coalition government in 1996.

Australian production is currently about 10,000 tonnes of U3O8 annually, and this figure is rising steadily due to expansion at the Olympic Dam and Ranger mines and commissioning of the new Beverley mine in South Australia. Honeymoon mine in South Australia is anticipated to start production in the near future. Development of Jabiluka in the Northern Territory is held up pending Aboriginal agreement for transport to and treatment of the ore at the Ranger site.

Australia currently provides a quarter of the world's uranium from three mines, and possesses 28 per cent of the world's easily recoverable reserves. All Australian uranium is exported as uranium oxide concentrate (U3O8). Australia supplies uranium to eleven countries, and exported 9,402 tonnes of U3O8 in 2004. Uranium is now the only mineral subject to export controls, to enable stringent safeguards (accounting procedures) to be applied, precluding its use in weapons.

The amount of electricity generated from use of Jabiluka ore will be sixteen times the electricity used annually by Australia.

Australia's major competitor is Canada, which produces significantly more uranium than Australia and is strongly expanding its capacity, facilitated by favourable government policy and operating conditions.

In Western Australia it is the State Labor Government's present intention to amend the *Mining Act 1978* to prohibit the mining of uranium. AMEC sees no reason to amend the *Act*, given that the Government can achieve its policy objective using the existing provisions of the *Act*. Under s 110 of the *Act*, the Minister can exercise the discretion to grant mining leases which do not allow the lease holder to mine uranium and about 250 leases have been issued to date in this way.

We consider it unwise to amend the *Act* as proposed. At some time in the future it may be necessary to develop the State's uranium resources for reasons of energy supply. It would be short-sighted and irresponsible in our view to restrict the options of a future State Government which may need to pursue different policy objectives in the interests of Western Australia.

## THE ISSUES

- Nuclear energy has been contentious for a number of years within the community, centred on questions of nuclear wastes, safety and possible weapons proliferation.
- Nuclear power is used throughout the world as a cost effective and environmentally responsible form of electricity generation. As we progress during the 21st century, the very tangible economic and environmental benefits of nuclear technology cannot be ignored.
- The Australian community as a whole must not be deprived of the economic and environmental benefits which a profitable and sustainable uranium mining, processing and export industry increasingly provides.
- Good public policy demands a balanced scientific approach to issues associated with uranium and nuclear matters generally.
- Logically, if it is safe to mine a number of deposits and export the product under strict environmental health and international arms control conditions, it should also be safe and reasonable to expand the uranium industry for peaceful use, thus tapping a greatly expanded income stream for the Australian community.
- The effect of current Labor policy with respect to uranium mining would be (if implemented) globally negligible, as there are plenty of other supply sources which operate under the same international safeguards regime. A policy of restriction on Australian supply is thus of little effect in controlling the global supply of uranium, and can only diminish competition in the global marketplace.
- Current Labor policy effectively restricts the readiness of people to invest in Australian uranium exploration and mining and thereby effectively consolidates Canada's current advantage as the leading world producer of uranium. Canadians are the chief, and possibly only, beneficiary.
- Australian scientific innovation has produced at least two important technologies related to the civil nuclear fuel cycle - SILEX enrichment and SYNROC waste immobilisation. Both have been developed with US funding. There is a strong argument for such value-adding technologies being deployed here in their country of origin.
- Greenhouse emission reduction targets adopted at the 1997 Kyoto Summit are unlikely to achieve anything globally unless forms of emission-free electricity generation such as nuclear power are increasingly utilised. This must eventually include Australia.

## PRODUCTION AND EXPORTS

- In 2004 Australia produced 10,592 tonnes of uranium oxide (U<sub>3</sub>O<sub>8</sub>) from its three established mines. Total exports were 9,402 tonnes. Australia's exports amount to about one quarter of the world total mine production.
- Australia's uranium exports represent more than one third of our total energy exports in thermal/energy terms - about 4,000 PJ out of around 10,000 PJ total.

## ECONOMIC BENEFITS

- Australia's uranium export revenue was A\$410 million in 2004, and the industry is thus worth some A\$1 billion per year to the Australian economy, and is forecast to increase. There are considerable flow-on benefits to the economy from this industry.
- Uranium mining contributes to the economy in the form of corporate and PAYE income taxes, indirect taxes and royalties and the provision of employment.
- In the Northern Territory, ERA makes a payment of 4.25 per cent of its gross sales revenue plus an annual rental of \$200,000 for the use of the land. Payments so far total over \$189 million for Ranger and \$7 million for Jabiluka, mostly passed on to Aboriginal groups and traditional owners.

## ENSURING HEALTH AND SAFETY

- Australia has had over 40 years experience in applying international radiation safety regulations at uranium mines. Australia's radiation safety regulations today are among the most comprehensive and stringent in the world.
- Uranium mining companies have taken active steps to reduce possible radiation risk below international standards. Australian companies have voluntarily adopted the most recent international recommendations on safe radiation levels, published by the International Commission on Radiological Protection (ICRP), without waiting for a revision of the 1987 Health Code in Australia. Maximum actual exposure levels at Australian mines are about half those specified, and average levels are little more than from natural background.

## PROTECTING THE ENVIRONMENT

- The environmental aspects of a uranium mine are in most respects the same as those of any other metalliferous mining. A project requires all the relevant environmental approvals, including a publicly available environmental impact statement, prior to commencement, and must comply with all environmental conditions applying to it.
- Uranium mining in the Kakadu region is subject to additional intense monitoring by the Supervising Scientist Group, a Commonwealth body set up for the purpose. This applies to the established Ranger mine and the new Jabiluka proposal.

- Operators of existing mines have developed high and internationally recognised levels of expertise in environmental management. Uranium mines today aim for zero emission of harmful pollutants. The only water release is of surface run-off and is close to drinking standard. Tailings retention does not cause pollution off site and the level of radioactivity in uranium tailings is very low. With normal engineering, tailings pose no threat to people or the environment.
- Safe methods for the final disposal of high and intermediate level waste from nuclear power generation are technically proven but not yet required. Meanwhile, storage and transport of such wastes is safe and uneventful. Nuclear power is the only energy producing technology which takes full responsibility for all of its wastes and fully costs this into the product.
- Best practice environmental management culminates in safe decommissioning and successful rehabilitation at the end of a mine's life. The first major rehabilitation project of a uranium mine in Australia, Mary Kathleen in Queensland, won an award for engineering excellence upon completion in 1985, and the 1990s rehabilitation of Nabarlek is even better.

#### **PREVENTING NUCLEAR PROLIFERATION**

- Australia's uranium is sold for exclusively peaceful purposes, namely electric power generation.
- The Australian Safeguards and Non-Proliferation Office (ASNO) keeps account of all nuclear material originating in Australia. Australia is a party to the 1970 treaty on the Non-Proliferation of Nuclear Weapons (NPT), and applies both international safeguards procedures and its own additional bilateral safeguards.
- Australia has in place an accounting system that follows uranium from the time it is produced and packed for export, to the time it is reprocessed or stored as nuclear waste, anywhere in the world.
- Australia's position as a major uranium exporter assists our influence in the ongoing development of international safeguards and other non-proliferation measures, which have arguably been the United Nation's most conspicuous success.

#### **AUSTRALIA'S PLACE AS A LEADING WORLD PRODUCER**

- Australia has the largest low-cost and easily-recoverable reserves of uranium in the world, amounting to at least 28 per cent of the global total. Canada however, whose low cost reserves comprise only 14 per cent of the world's total, produces much more uranium than Australia, - a third of the world's mine output, valued at some A\$700 million per annum.
- With reserves twice those of Canada, despite little exploration over the last fifteen years, Australia is in the position of being capable of significantly increasing its uranium production and exports in direct competition with Canada.
- In the five years to mid-2004 Australia exported 43,803 tonnes of uranium oxide concentrate with a value of over A\$2 billion to eleven countries.

## POTENTIAL ECONOMIC BENEFITS FOR AUSTRALIA

- Additional low-cost mines in Australia would supply a substantial proportion of the needed increase in world output. Had the former Labor government's "three mines policy" never existed, output from existing and new mines was projected by an Access Economics report in 1994, to increase to 13,400 tonnes a year by 2004, a five-fold increase over a decade.
- Modelling the effect on the Australian economy, the net present value of increases in real consumption up to 2010 resulting from allowing new development would be in the range of \$890 million to \$1.66 billion. Additional contributions to the economy in the form of employment, taxes, royalties, export income and contribution to balance of payments, would be considerable.

## ASIA AS A GROWTH MARKET FOR URANIUM

- While growth in nuclear power in the USA and Western Europe has been small recently, Australia is located in the only region in the world where electricity generating capacity and specifically nuclear power generation is growing significantly.
- In East and South East Asia there are currently about 100 nuclear power reactors in operation, 20 under construction and firm plans to build another 40.

Japan, for example, currently generates 39 per cent of its electricity from nuclear power. By 2010 this is estimated to grow to over 40 per cent, or 50 per cent if greenhouse reduction targets are met. China is moving rapidly ahead in building new nuclear power plants. Chinese electricity demand has been growing at more than 8% per year.

- Australia's abundance of uranium reserves will further ensure its future position as a leading world supplier to these markets, provided a politically and economically favourable environment in Australia is maintained. The greatest growth in nuclear generation is expected in China, Japan, South Korea and India.

## NUCLEAR POWER AS AN ALTERNATIVE SOURCE OF POWER GENERATION

- Nuclear power is cost competitive with other forms of electricity generation in many OECD countries, except where local access to low cost fossil fuels exists, in countries such as Australia. Over thirty countries use nuclear energy and eighteen of these produce more than a quarter of their electricity in this way.
- While natural gas used for large-scale electricity generation produces less greenhouse gases than coal, there are major questions of opportunity cost and inter-generational equity to be addressed. Coal remains the economically attractive option in Australia, but environmentally responsible greenhouse reduction measures must continually be considered.
- There is a strong case for reviewing how electricity is generated in Australia, and properly assessing whether nuclear energy should contribute in the next decade.

## GREENHOUSE REDUCTION MEASURES

- Global electricity demand is expected to increase dramatically (by about 50%) to 2020. To support this growth, world coal production will need to rise to an extent that will significantly increase greenhouse gases in the earth's atmospheric system, especially from developing countries
- Nuclear power, which now supplies 16 per cent of the world's electricity, produces no greenhouse gases. Nuclear power is a clean, safe and effective way of producing electricity on a large scale. While its other wastes are significant and are often considered to be a major problem, they are safely contained and managed, and not released into the atmosphere.
- Every 22 tonnes of uranium (26 tonnes U3O8) used, saves the emission of 1 million tonnes of carbon dioxide, relative to coal. To run a 1000 megawatt power station for a year (providing 7 billion kWh), either 200 tonnes U3O8 is needed, or 3.2 million tonnes of black coal, which produces 7-8 million tonnes of carbon dioxide. If all of the world's nuclear power was replaced by coal fired power, carbon dioxide emissions from electricity generation would rise by one third, about 2.3 billion tonnes per year.
- Emission reduction targets adopted at the Kyoto summit in December 1997, will require a global increase in other, less carbon-intensive forms of energy. The continued and expanded use of nuclear power is one of a range of measures which will effectively limit future global carbon dioxide emissions. Nuclear power is the only proven large scale technology for base load power supply which does not release substantial amounts of carbon dioxide.
- Australia is well placed to make a significant contribution to greenhouse gas emission reduction targets through increased production and supply of uranium. In the light of the favourable outcome for Australia at Kyoto, government now has a moral responsibility to contribute to reducing global greenhouse emissions.

## GLOBAL SUPPLY AND DEMAND

- Australia is one of the main suppliers of uranium to the world's nuclear power industry for the generation of electricity.
- Australia has the largest reserves of uranium in the world, with about 28 per cent of the world total.
- World mine production in 2003 amounted to 42,000 tonnes of U3O8, while consumption for the year amounted to some 77,600 tonnes. Mine supply thus provided only about half of demand.
- Global electricity use is increasing dramatically, growing at a rate of 2.7% per year. Today, 16 per cent of the world's electricity is generated by nuclear power. The actual amount of nuclear electricity produced is increasing slowly, but may increase more rapidly in the next decade as nations opt to utilise more efficient and less greenhouse-intensive means of generating electricity.



- Production from world uranium mines today amounts to just over half of the uranium that is consumed for electricity generation. The balance is made up from stockpiles and recycled ex-military uranium which has been blended down for use in civil reactors.
- This factor, combined with the rapidly increasing global demand for electricity, means that mine production of uranium will need to expand significantly over the next decade.
- The current situation presents a major, though not immediate, opportunity for new producers in world uranium markets. This is the time to be identifying new ore bodies.